volume, a volume which undoubtedly will take a high rank among modern text-books of zoological science. It is something better than a mere text-book of embryology, as it deals very fully with many of the most important principles of biological philosophy, and will prove very useful as a guide for practical research work in other branches of zoological science. S. J. H.

THE RARER ELEMENTS.

(1) *The Analysis of Minerals and Ores of the Rarer Elements for Analytical Chemists, Metallurgists, and Advanced Students.* By Dr. W. R. Schoeller and A. R. Powell. (Griffin's Scientific Text-books.) Pp. x+239. (London: Charles Griffin and Co., Ltd., 1919.) Price 16*s.* net.

(2) *The Metals of the Rare Earths.* By Dr. James Frederick Spencer. (Monographs on Inorganic and Physical Chemistry.) Pp. x+279. (London: Longmans, Green, and Co., 1919.) Price 12*s.* 6*d.* net.

THE two volumes before us, taken together, form a very complete treatise on the rarer elements, their occurrence, properties, and the methods for their separation. Although they overlap in some measure, each contains much information of the highest importance at the present day.

The practical value of many of the rarer elements has recently been brought into prominence, and it is becoming increasingly plain that, locked up in these little-known minerals widely distributed over the earth's surface, there are elements possessing properties of hitherto unrealised value and importance.

Radium has shaken the old conceptions in chemistry and physics to their very foundations. Uranium, tungsten, tantalum, molybdenum have given us steels which have profoundly influenced the engineering trades and the production of artillery. Thorium and cerium have preserved the gas industry as a means of illumination. Cerium and the rare earth metals rendered us almost independent of the lucifer match. These are but a few indications of the potential value of the rarer elements.

(1) This volume, which naturally comes first, deals exhaustively with the minerals from which the rarer elements are derived, and gives very clear and practical instructions for their recognition, and the properties, chemical reactions, and method for separating the elements. The design of the work is distinctly original, and the authors have included as much trustworthy information about each element as is available at the present time, together with descriptions of the spectroscopic, magnetic, electroscopic, and other apparatus used in research. It is abundantly clear that they have a very practical acquaintance with their subject; novel chemical and physical reactions are given that are apparently taken direct from the laboratory note-books.

The elements are taken in the order of their groups in the periodic system, and the text is arranged under two headings—"General Information," which includes spectroscopic and other physical reactions; and "Mineral Analysis," including qualitative and quantitative estimations and chemical reactions.

There is no general index, but in its place two lists are produced, one giving the names of nearly two hundred minerals containing rare elements, and the other the various methods for separating them from the bodies most frequently accompanying them.

A table of atomic weights and gravimetric factors is included.

(2) The title of this volume strikes one as a little inappropriate, for the metallic properties of the rare earth elements are those about which least is known, but the author is to be congratulated upon having collected together the essential details of all that is known in the domain of the "Rare Earths."

This field has a fascination of its own, quite apart from any utilitarian considerations; that is only realised by those who have worked in it; so great is that fascination that it has claimed the best energy of some of the most honoured men of science. Berzelius, Nilson, Clevé, Lecoq de Boisbaudran, Delafountain, Moissan, Crookes, Urbain are only a few that have fallen under the spell of the "Rare Earths." The work, hitherto exceedingly difficult on account of the rarity of the minerals needed, has been greatly facilitated by the development of the "mantle" industry, because in the extraction of the very large quantities of thorium and cerium needed for that purpose, all the members of the rare earth group are thrown out as by-products, and can be procured with comparative ease.

The substantial monograph under notice is an advance upon any of the excellent works that have recently appeared on the subject. The most remarkable feature in the volume is the great number of references to authorities that are given; these number as many as 1029, and will be found of very great value to the student, enabling him easily to consult the original memoir.

The author's remarks, though good, are sometimes liable to be misleading; in this connection we notice that, in reviewing the work of the late Sir William Crookes on the rare earths, and the suggestion there put out as to the possible existence of "meta-elements," the author states on page 7 that Crookes, by fractional precipitation, obtained seven fractions of different basicity which had different absorption spectra, which he called meta-elements. This may be a clerical error by the use of the term "absorption" instead of "phosphorescence," for the matter is quite correctly stated on page 66.

In point of fact, Crookes's contention was that the purest yttria obtainable gave under the cathodic discharge, *in vacuo*, a discontinuous spectrum consisting in numerous more or less nebulous coloured bands, and that by fractionating this material it was possible to separate these band-

©1919 Nature Publishing Group

forming bodies from each other, and it was to these bodies, all components of pure yttria, that he gave the name of meta-elements. This question of the cause of the discontinuous phosphorescent spectra is by no means settled, and offers a field of most interesting research.

The history and analysis of each of the chief rare earth minerals is given, and this is followed by a good description of the various methods of fractionation used for separating the closely associated members of the rare earth groups. The methods of spectroscopic analysis are given, as is also the use of the magnetometer, an instrument only recently applied to these researches.

The cerium and yttrium groups of the rare earths are each separately described, and the latest determination of the atomic weights are given, together with the methods by which they were obtained.

In the discussion of the position of the rare earths in the periodic system the author includes the elements scandium and thorium, which for various reasons are not generally considered members of the rare earth group at all. It is not difficult to find places for these, especially the former, which is undoubtedly the "ekaboron" of Mendeléeff, but the placing of the closely allied bodies of the cerium and yttrium groups remains as big a puzzle as ever.

The final chapter deals with the uses of the rare earth elements; with the exception of cerium, which is absolutely essential to the production of an efficient "mantle," these are not numerous and are comparatively recent. But enough has been said to show the importance and value of the study of the rare earths, and the author's very complete work, taken in connection with that of Messrs. Schoeller and Powell, will aid very greatly in the study of these little-known bodies from which we can confidently expect great results.

J. H. GARDINER.

RACE AND NATIONALITY.

Race and Nationality: An Inquiry into the Origin and Growth of Patriotism. By Dr. John Oakesmith. Pp. xix + 300. (London: William Heinemann, 1919.) Price 10*s.* 6*d.* net.

THE thesis which Dr. John Oakesmith maintains in this work is one which concerns anthropologists as well as politicians and historians. His doctrine that the national frontiers of Europe have no racial significance is a truth so apparent that no proof needs to be adduced. Yet it is perhaps well that the fact should again be insisted on at the present time because the public mind is still influenced by the vigorous anthropological teaching of last century, wherein it was maintained that the Saxon and Celtic elements in the population of these islands were of diverse racial stocks. We agree with Dr. Oakesmith that there is no single character or set of characters in body or mind by which an anthropologist can tell an Irishman from an Englishman. The claim for Irish separation does certainly not depend on a difference of race, for both English and Irish are members of the same racial stock, and of the two the Irish are the more representative of the Nordic or North Atlantic race.

The independence of nationality and race, however, is but a minor issue in Dr. Oakesmith's main thesis. This concerns itself chiefly with an inquiry into the nature of nationality. He defines and redefines it in many passages, but the following may be taken as representing his final conclusion (p. 75): "Nationality is a conviction based upon practical realities, upon the facts of historical development, and upon the demands of human experience." This represents rather what he hopes nationality may come to mean in the future, for in the present he recognises that mixed with its rational or utilitarian qualities there are both passions and emotions. Rightly enough, he maintains that if these passions and emotions could be eliminated and only the intellectual conception of nationality left, then wars would cease, and the world would come by the peace it longs for. Such is the main thesis of this book.

Does race, then, play no part in separating and keeping apart the masses of humanity? Dr. Oakesmith seriously maintains that "to envisage race as an operating objective factor in evolution of societies is both unscientific and unphilosophical" (p. 74). He cites the case of the Jewish people in England to prove that "race is a metaphysical conception having no foundation in practical life." "With proper adjustments of education," Dr. Oakesmith solemnly asserts, "you can turn an Oriental Jew into an Occidental Englishman." In other words, were we to substitute a Jewish for a native baby in every cradle of England for a generation, English nationality would remain just what it has been since the Anglo-Saxon invasion. Or, to alter the parallel, if we were to substitute babies from China, Central Africa, or Greenland, England would stand just where she did if Dr. Oakesmith is right. It is unnecessary, in the light of experience to be gathered from every part of the world, where diverse races come in close contact, to do more than say that race, unfortunately, is much more than Dr. Oakesmith supposes it to be—a "metaphysical conception."

A. KEITH.

OUR BOOKSHELF.

Sanitation Practically Applied. By Dr. Harold Bacon Wood. Pp. vi + 473. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1917.) Price 13*s.* 6*d.*

THE author of this volume is assistant commissioner to the West Virginia State Department of Health, and he prepared it as a "corollary to the numerous excellent treatises on the theory of hygiene and the laboratory manuals" for the use primarily of the health officer and for the student of public health topics. In the main it is intended for and will best meet the needs of the American worker and student.

©1919 Nature Publishing Group